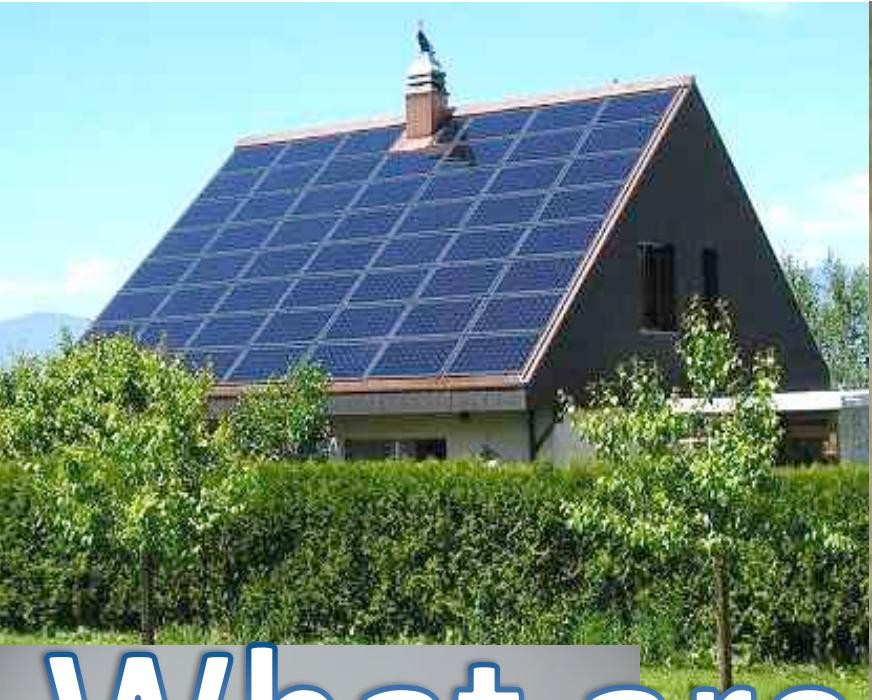


# **MY NASA DATA:**

## **Solar Cell Energy Availability from around the Country**



# What are solar cells?



## Let's get Thinking

If you wanted to live in an area where you could wear a jacket year round, how would you identify these areas?

One of the best ways would be to use satellite data. If you had to use a solar powered RV to travel, you would have to find areas in the country with enough solar radiation to support the vehicle. This can also be done using satellite data.

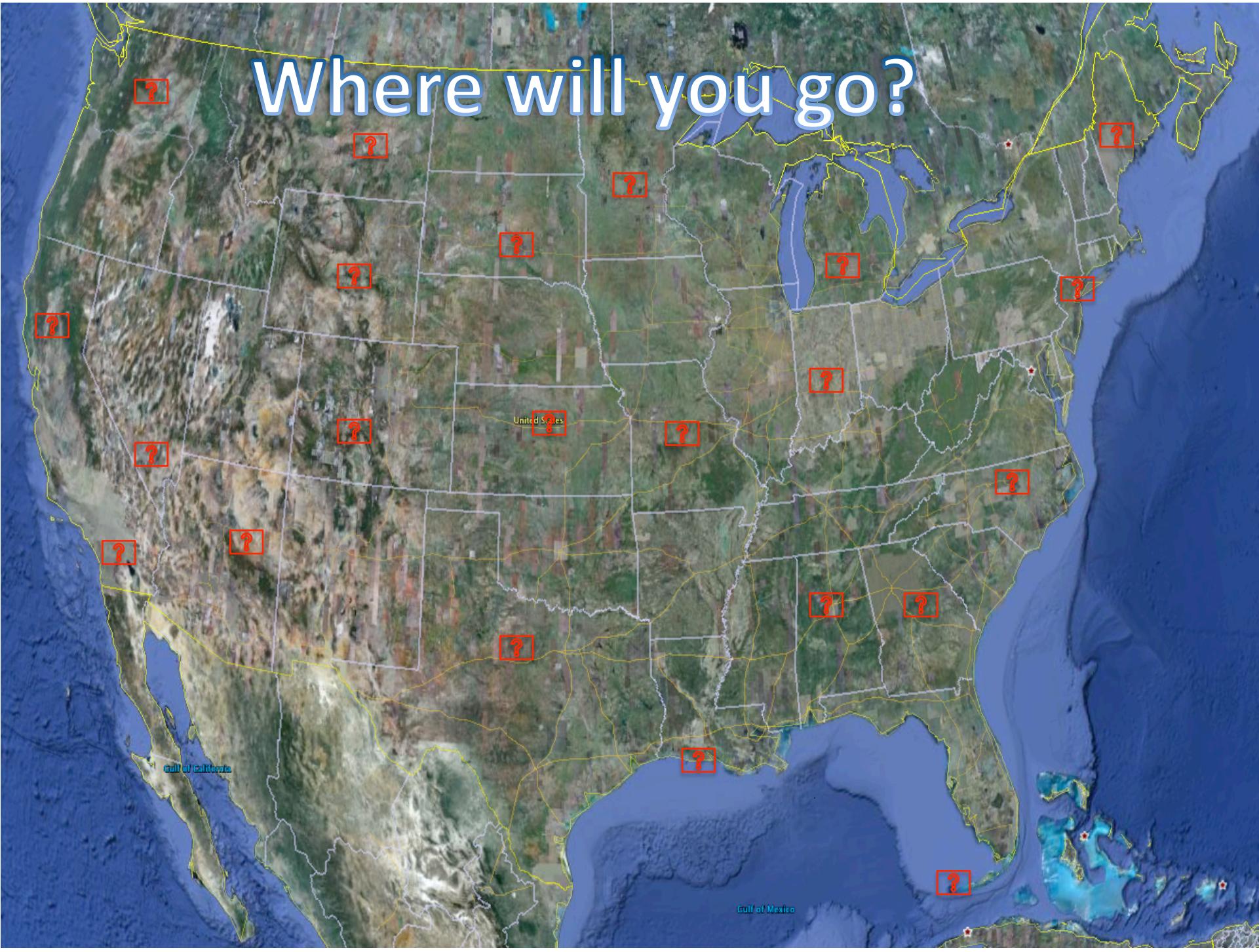
# The Problem

**Congratulations!** You have finally made it. You are the star you always wanted to be. However, the life of a rock star requires months on the road. Luckily you have plenty of money and a very nice 40' long Motor Home whose electricity is powered by solar panels. Life will change, and being successful means you can't always live at home. Your manager requires you to do the following things:

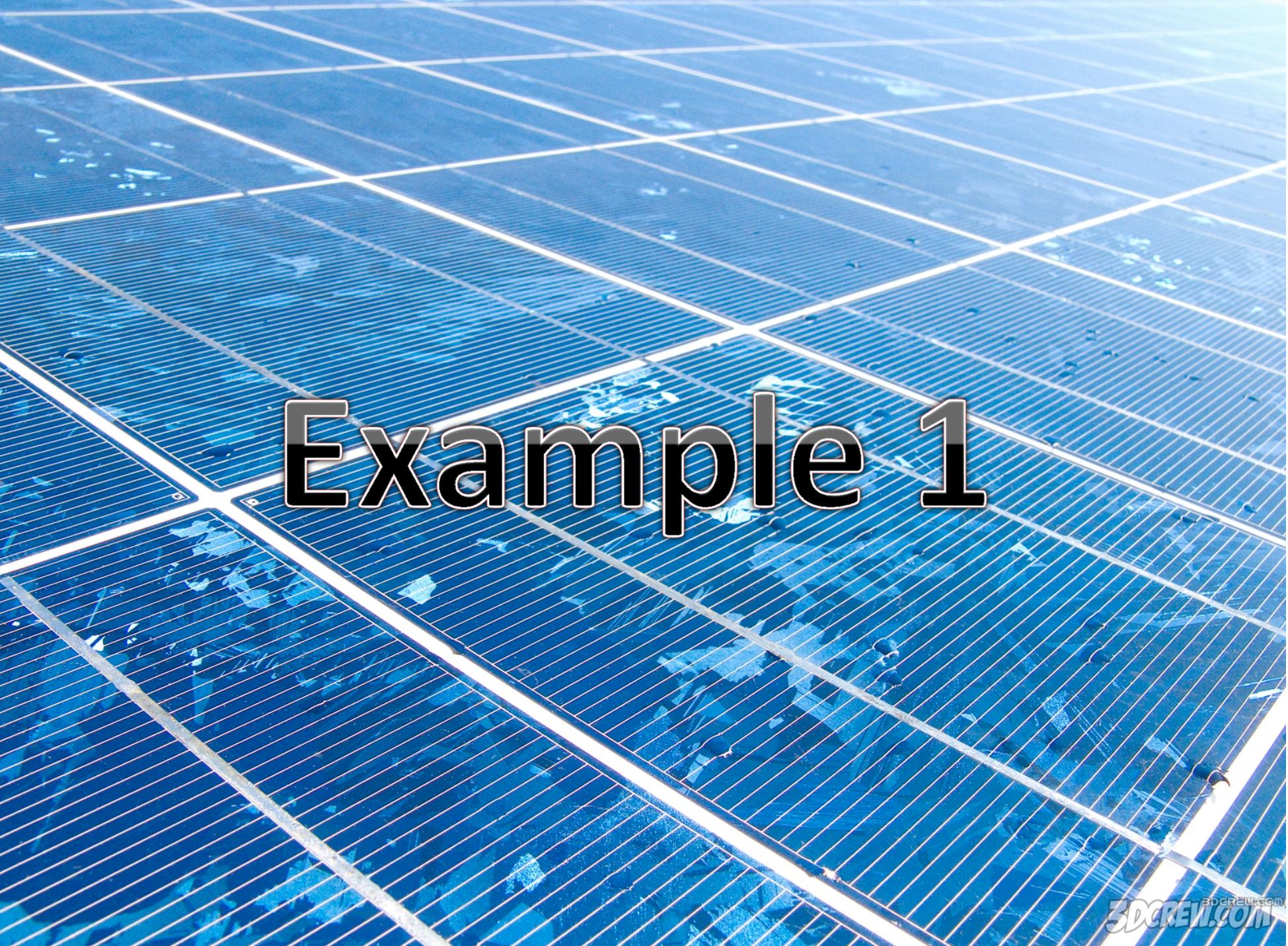
- For stability, you will live part of every year in Sheridan, Wyoming
- Since your performances take you to various parts of the country throughout the year, you must live in at least one other place, but you may only live in a maximum of 4 places throughout the year.
- Every place you live must have an average monthly sunlight of 100 watts/m<sup>2</sup> in order to run your needed electrical power for your home.



# Solar Cells on the Move



# Where will you go?



# Example 1

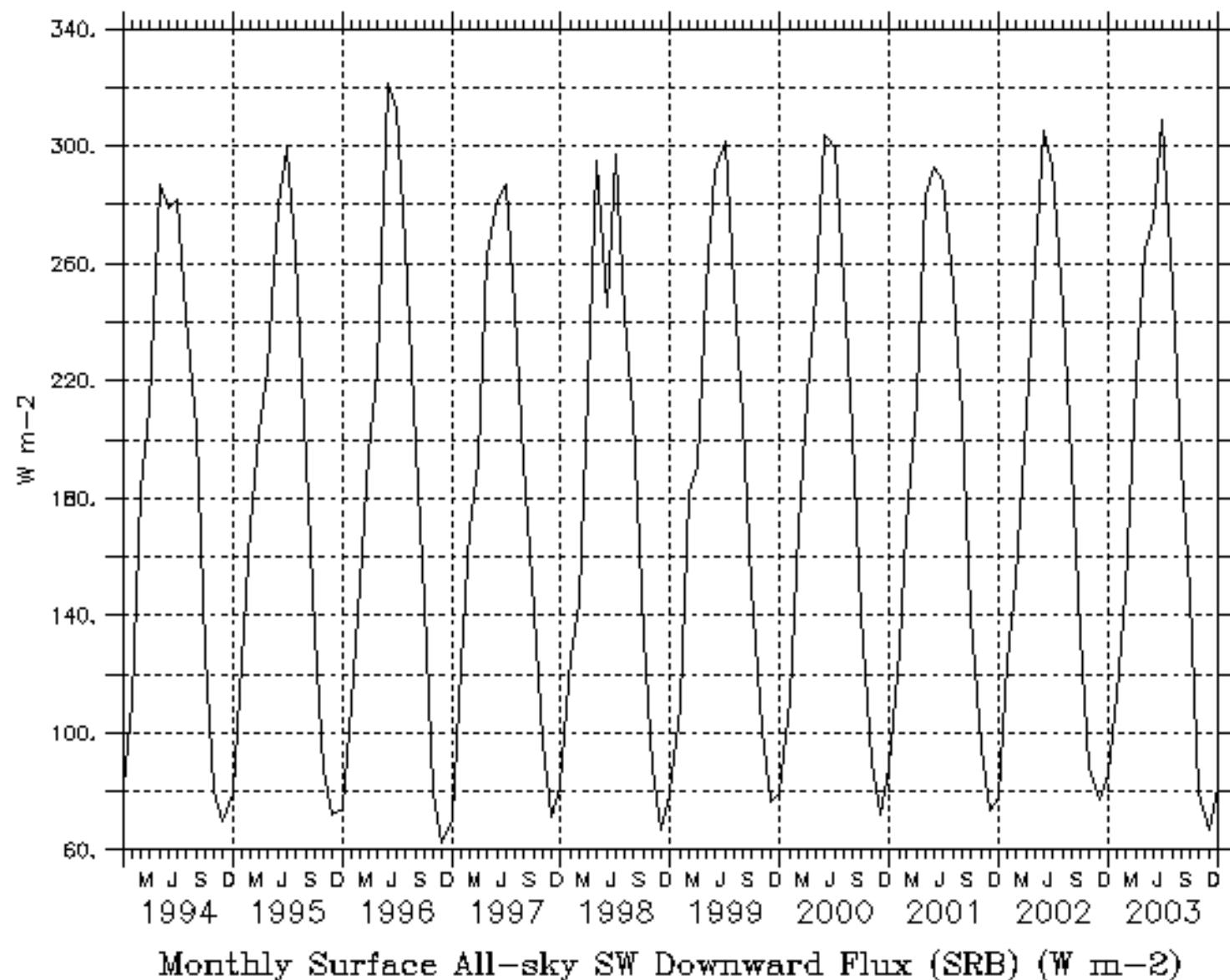


Lets start in  
**Sheridan Wyoming**

**Sheridan Wyoming**

## Sheridan, Wyoming

DATA SET: srb8.0\_mthly\_sw\_utc1988\_200706.nc



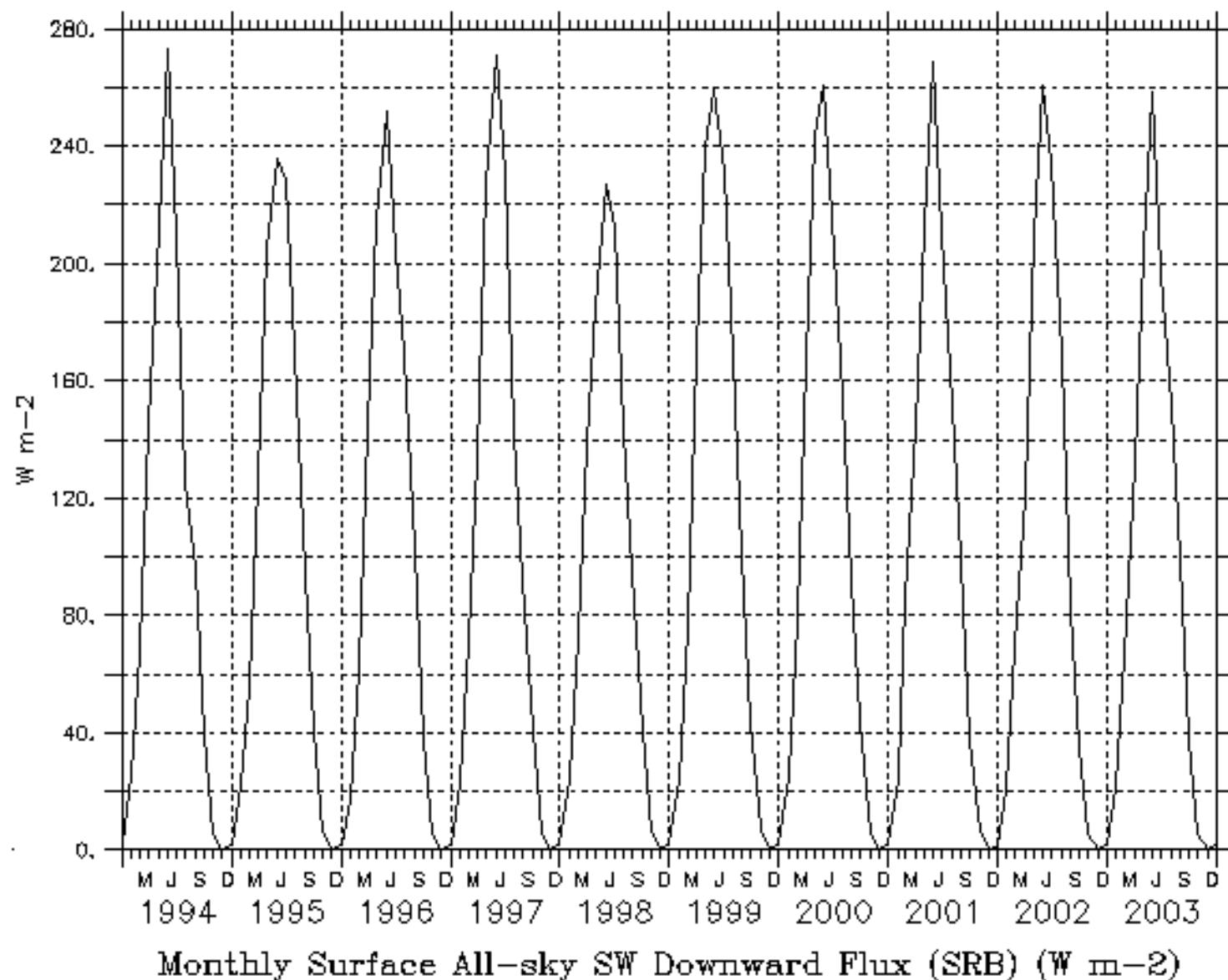


LAS 7.+ / Ferret 6.1

NOAA/PME

# North Pole, Alaska

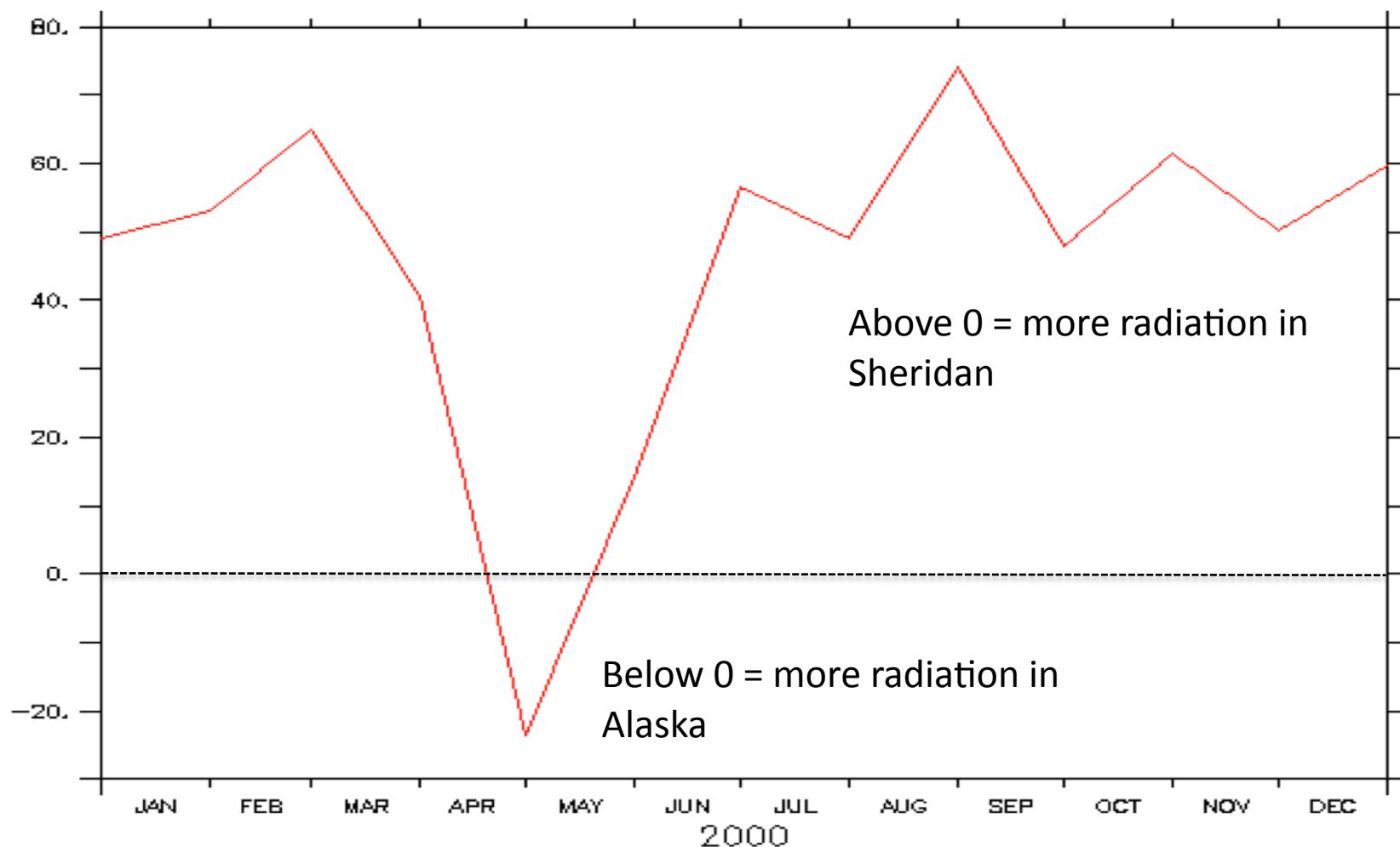
DATA SET: arb3.0\_mthly\_sw\_utc1983\_200706.nc



LAS 6.4.0/Ferret 5.80 -- NOAA/PMEL

Latitude(1): 45.0N Latitude(2): 61.0N  
Longitude(1): -108.0E Longitude(2): -134.0E

## Difference Plot of Wyoming and Alaska



Monthly Surface All-sky SW Downward Flux (SRB) (Watts/m²) from  
/usr/local/fer\_data/data/mon26\_sfc\_ae\_sw\_dn\_8907-0412.nc(1)  
- Monthly Surface All-sky SW Downward Flux (SRB) (Watts/m²) from  
/usr/local/fer\_data/data/mon26\_sfc\_ae\_sw\_dn\_8807-0412.nc(2)

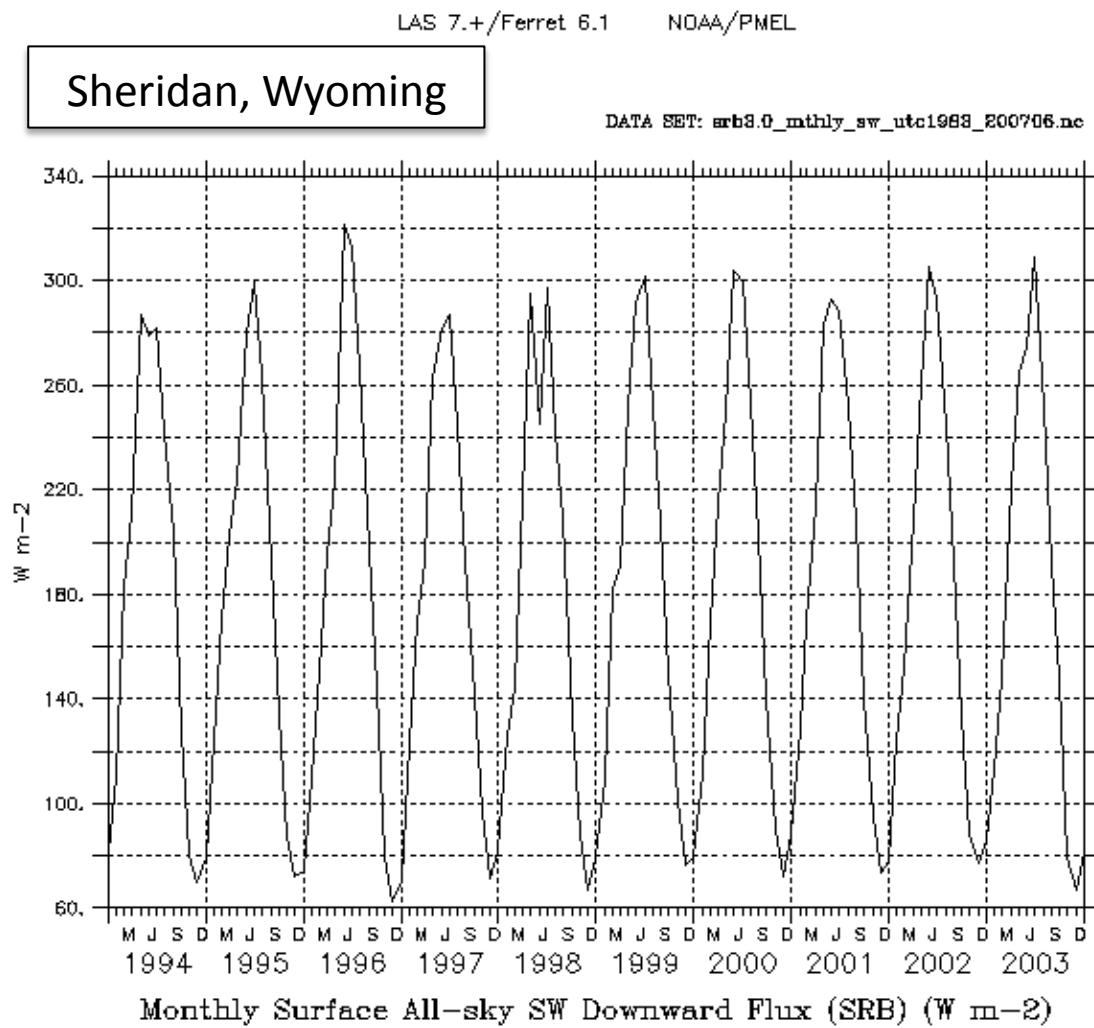
## Questions from Part 1

- What did Sheridan look like over 10 years?
- What did Alaska look like over 10 years?
- Were there seasonal changes in both locations ?
- What were the side scales in the overlay plot?  
What were the units?

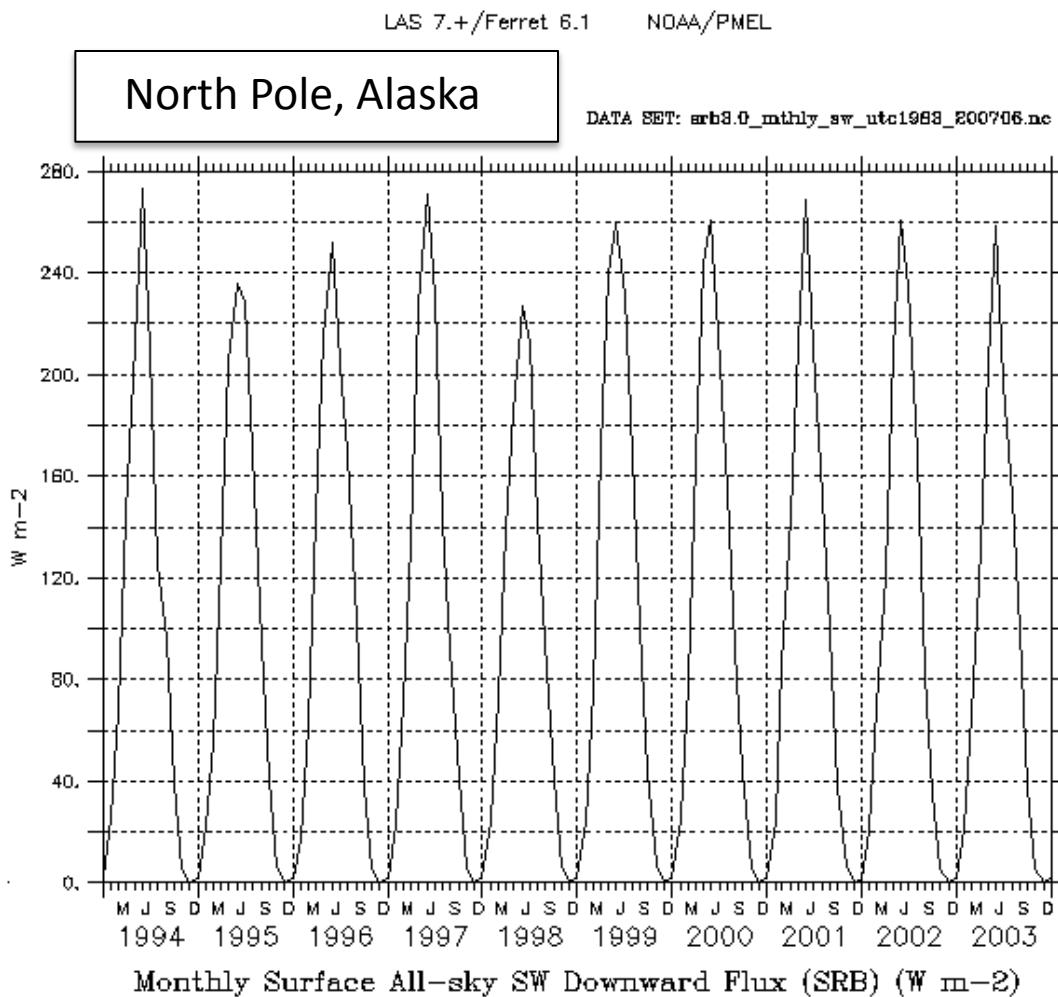
- What did Sheridan look like over 10 years?

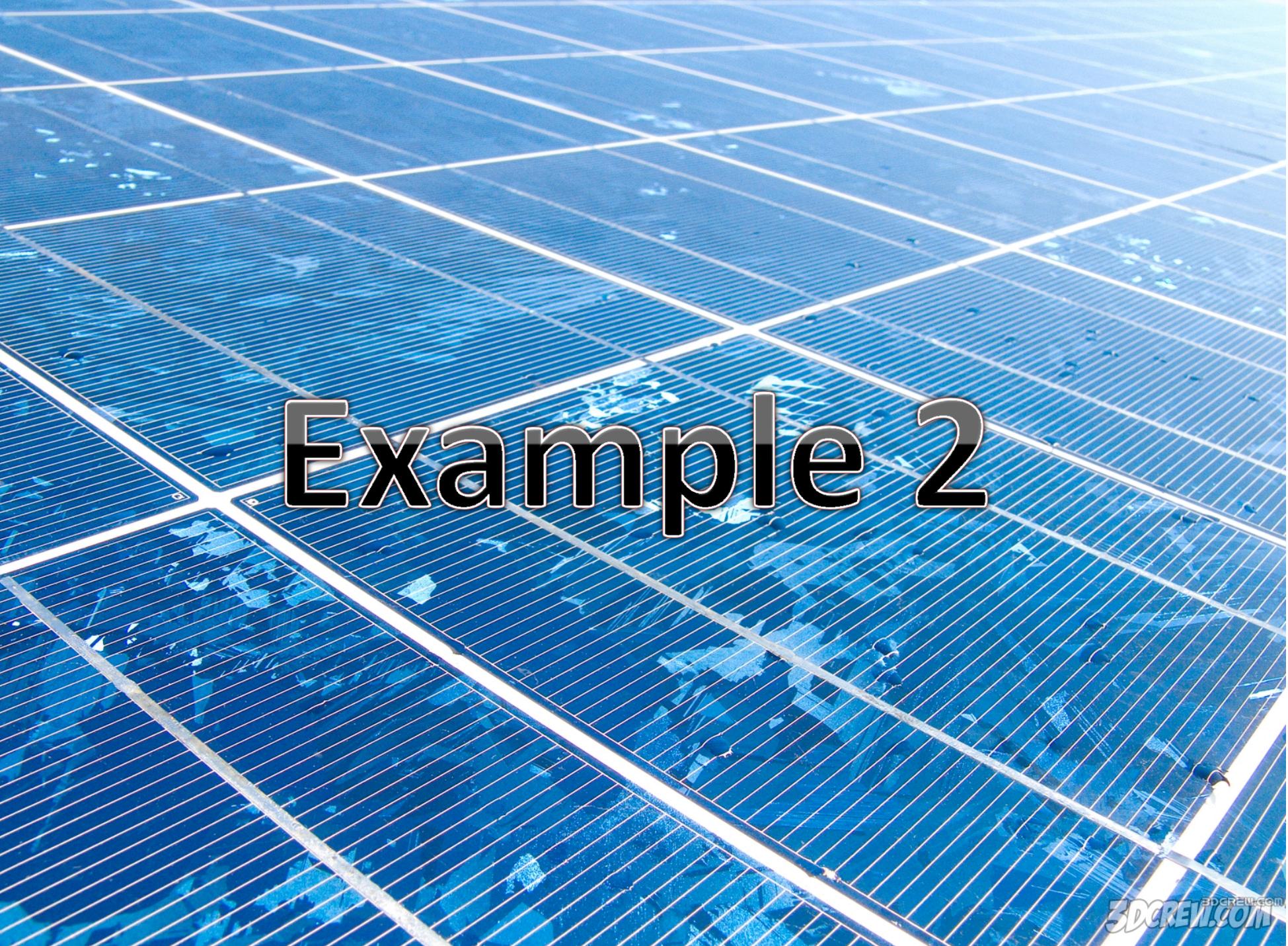
- Were there seasonal changes in Sheridan?

- What were the side scales in the overlay plot? What were the units?

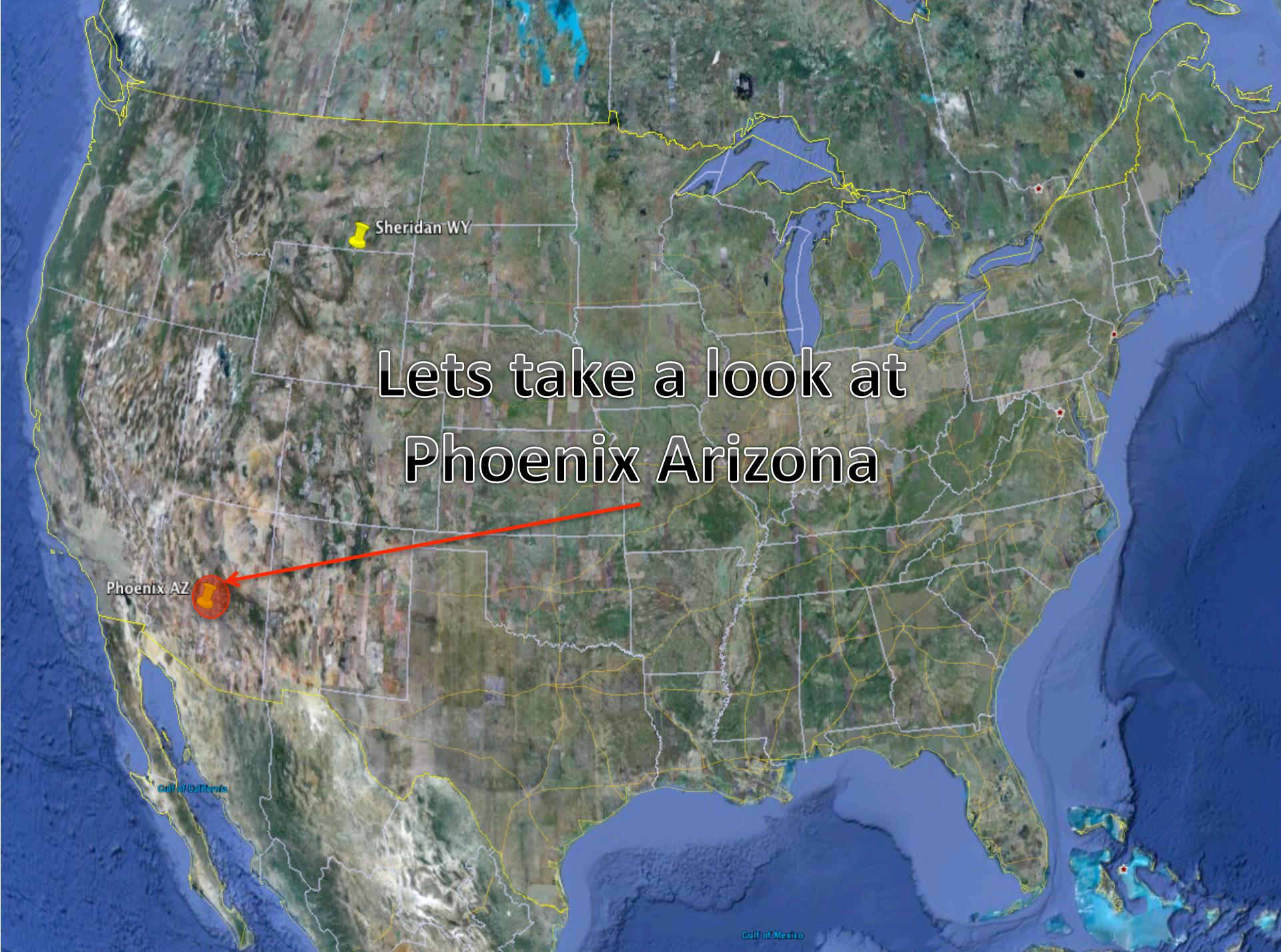


- What did Alaska look like over 10 years?
  - What were the seasonal changes in North Pole Alaska?
  - What were the side scales in the overlay plot? What were the units?





# Example 2



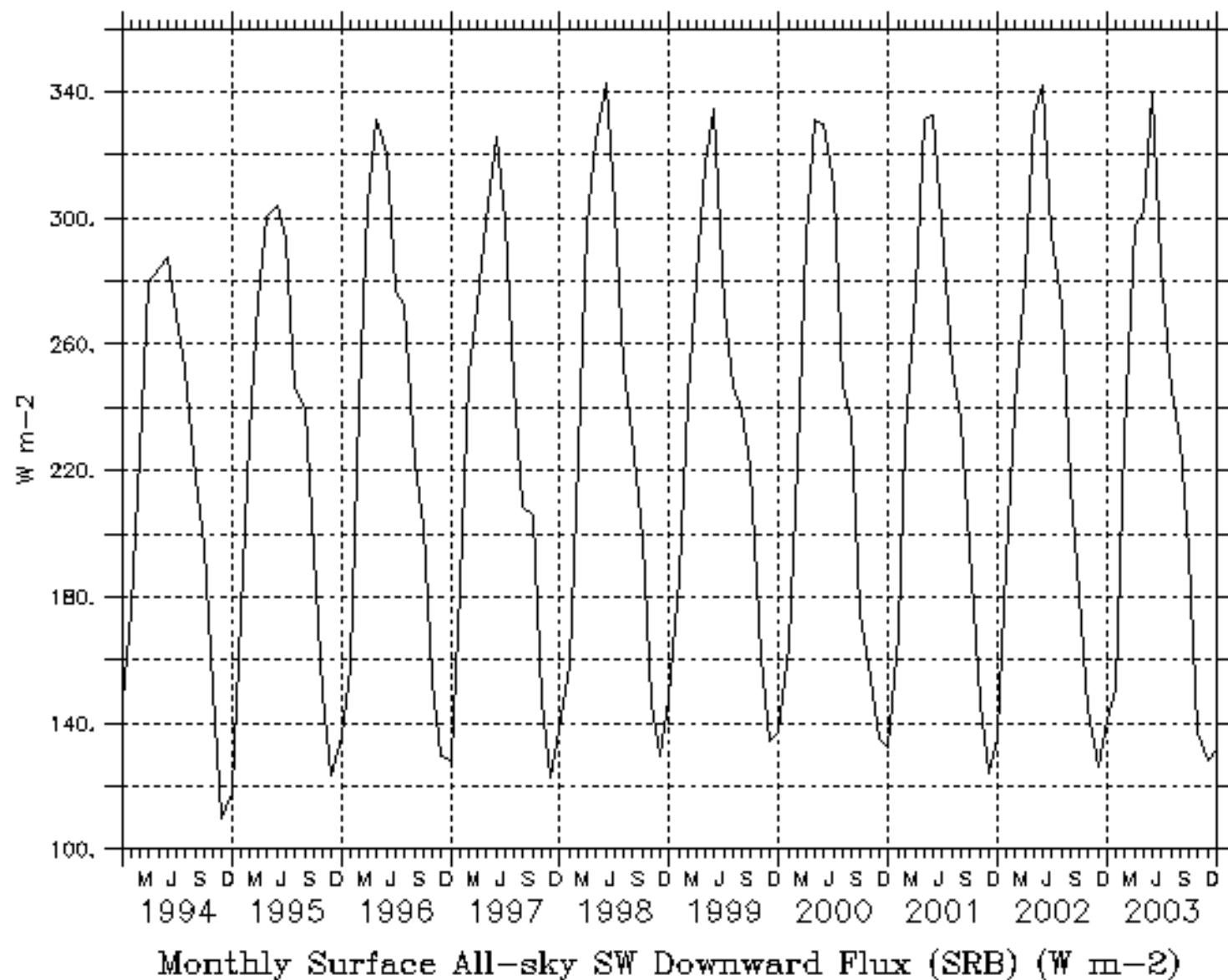
Lets take a look at  
Phoenix Arizona

LAS 7.+ / Ferret 6.1

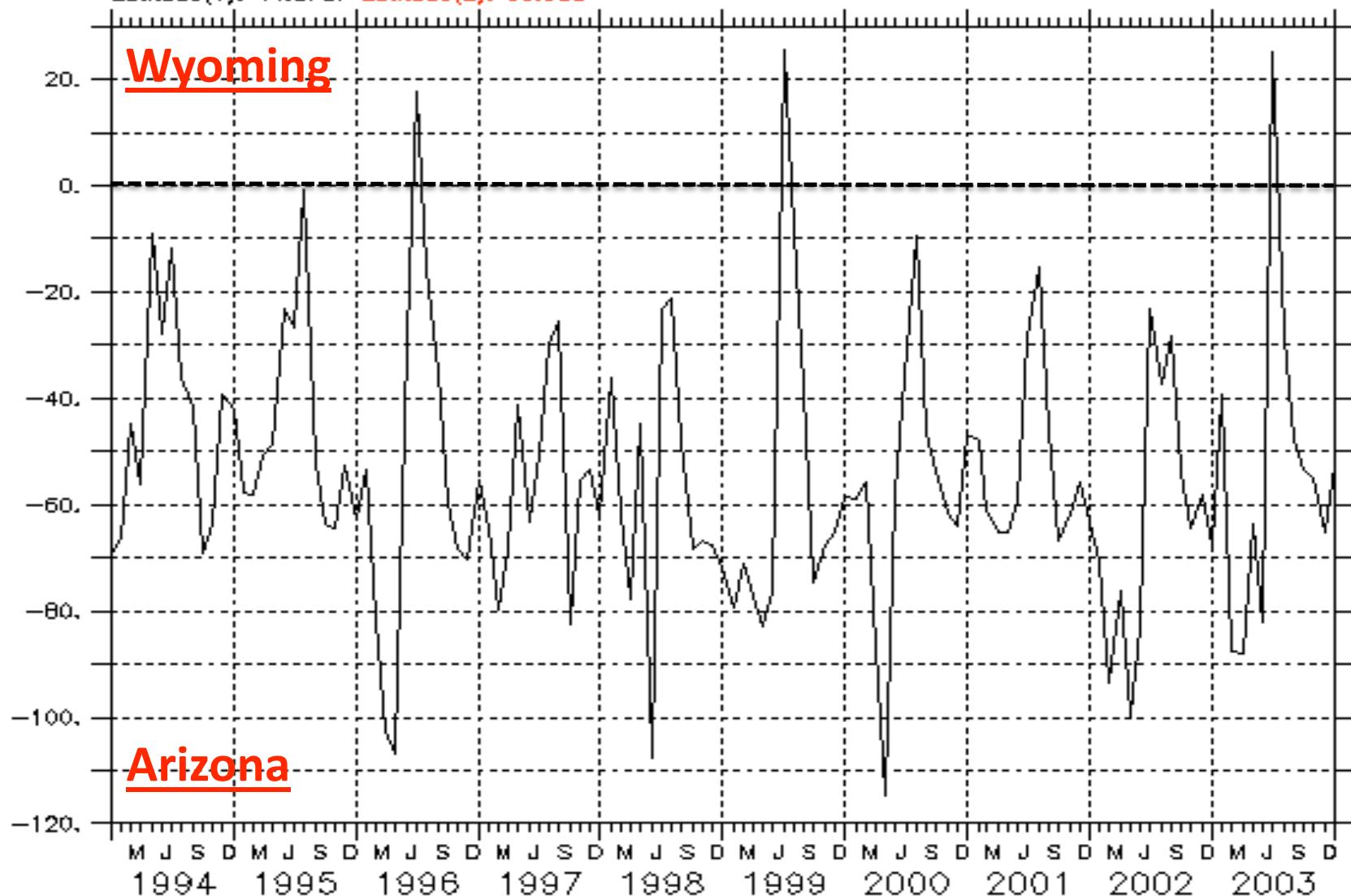
NOAA/PMEL

Phoenix, Arizona

DATA SET: `srbs.0_mthly_sw_utc1988_200706.nc`



Longitude(1): -106.31 Longitude(2): 247.6721  
Latitude(1): 44.8787 Latitude(2): 33.558



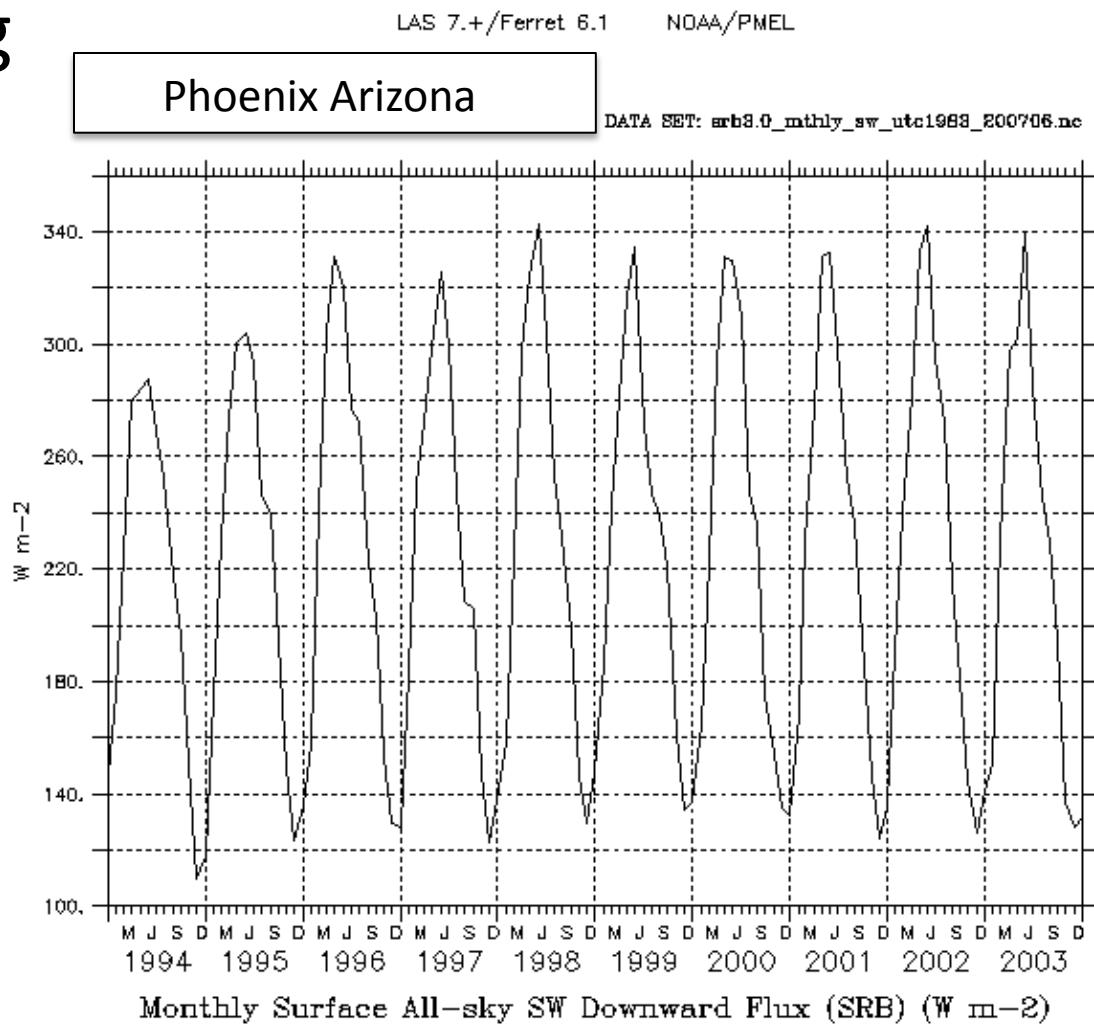
Monthly Surface All-sky SW Downward Flux (SRB) ( $\text{W m}^{-2}$ )  
from /data1/mynasadata/SRB3.0SW/srb3.0\_mthly\_sw\_utc1963\_200706.nc(1)  
Monthly Surface All-sky SW Downward Flux (SRB) ( $\text{W m}^{-2}$ )  
from /data1/mynasadata/SRB3.0SW/srb3.0\_mthly\_sw\_utc1983\_200706.nc(2)

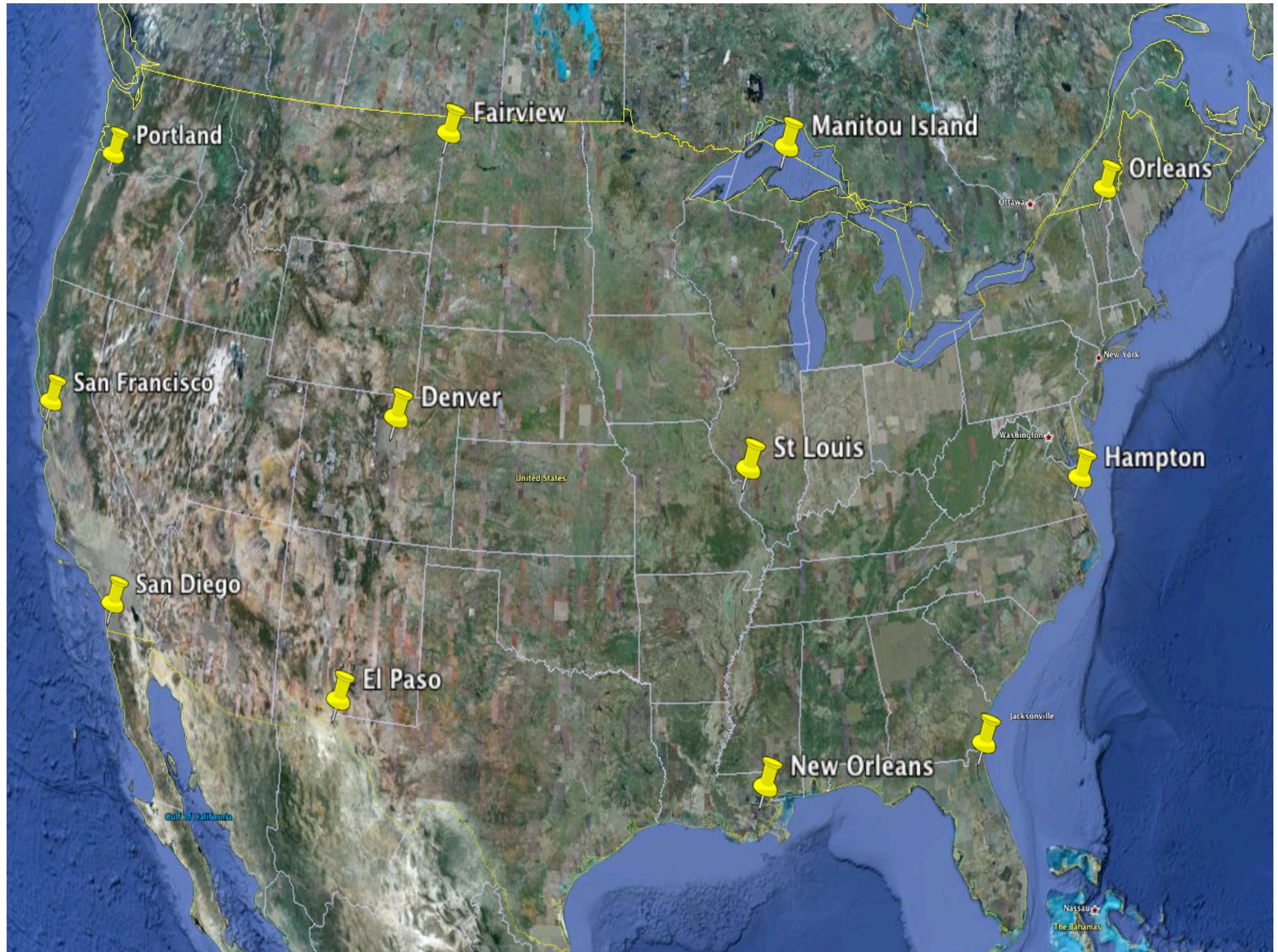
# Questions about Arizona

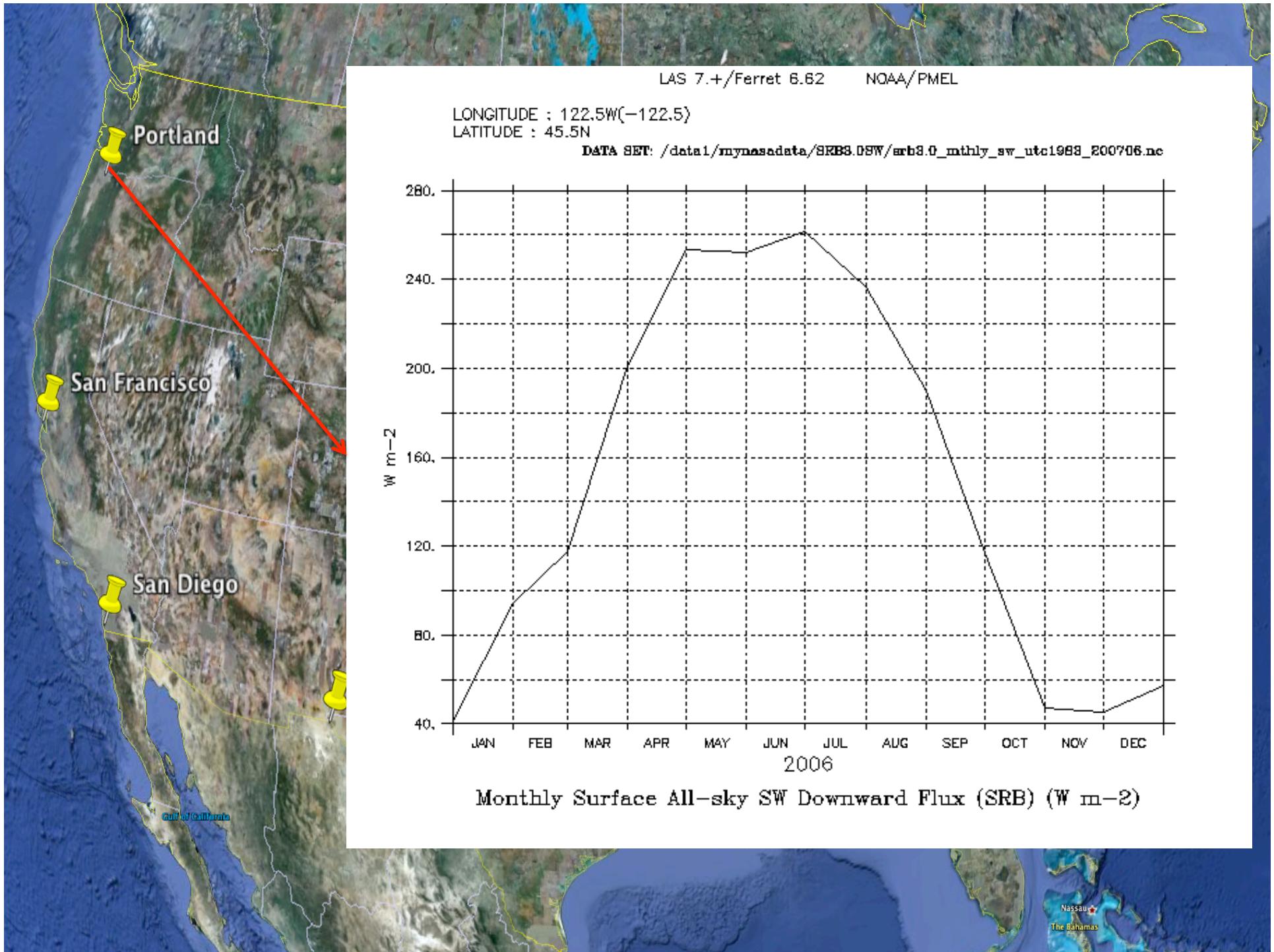
- What trends do you see for the long range?
- Can you find trends in the year?
- After looking at the difference plot, what can you conclude about the two locations?

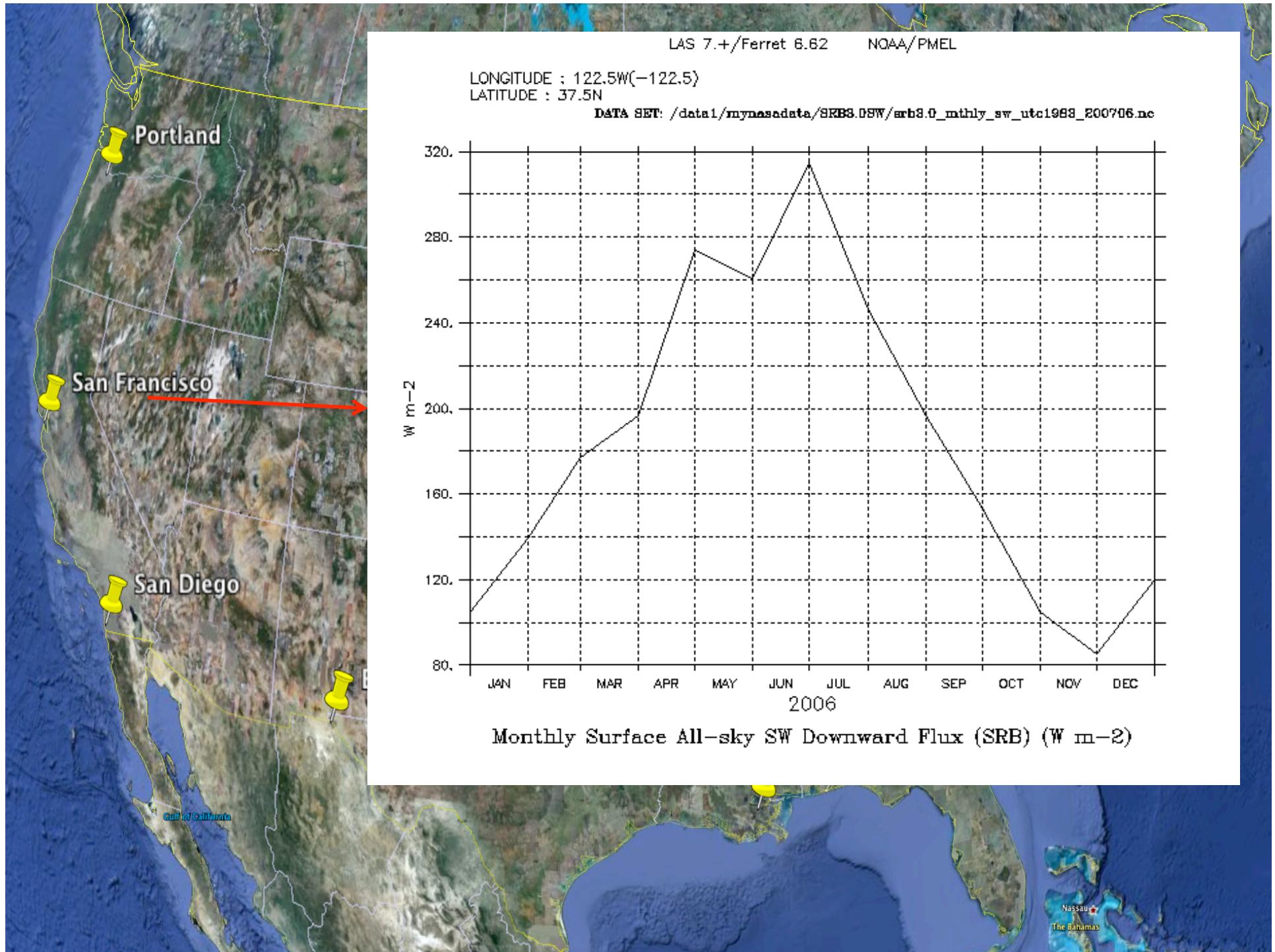
- What trends do you see for the long range?

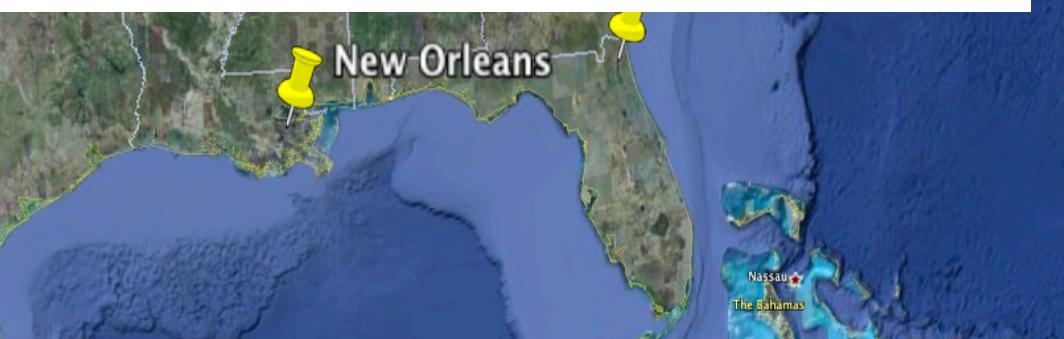
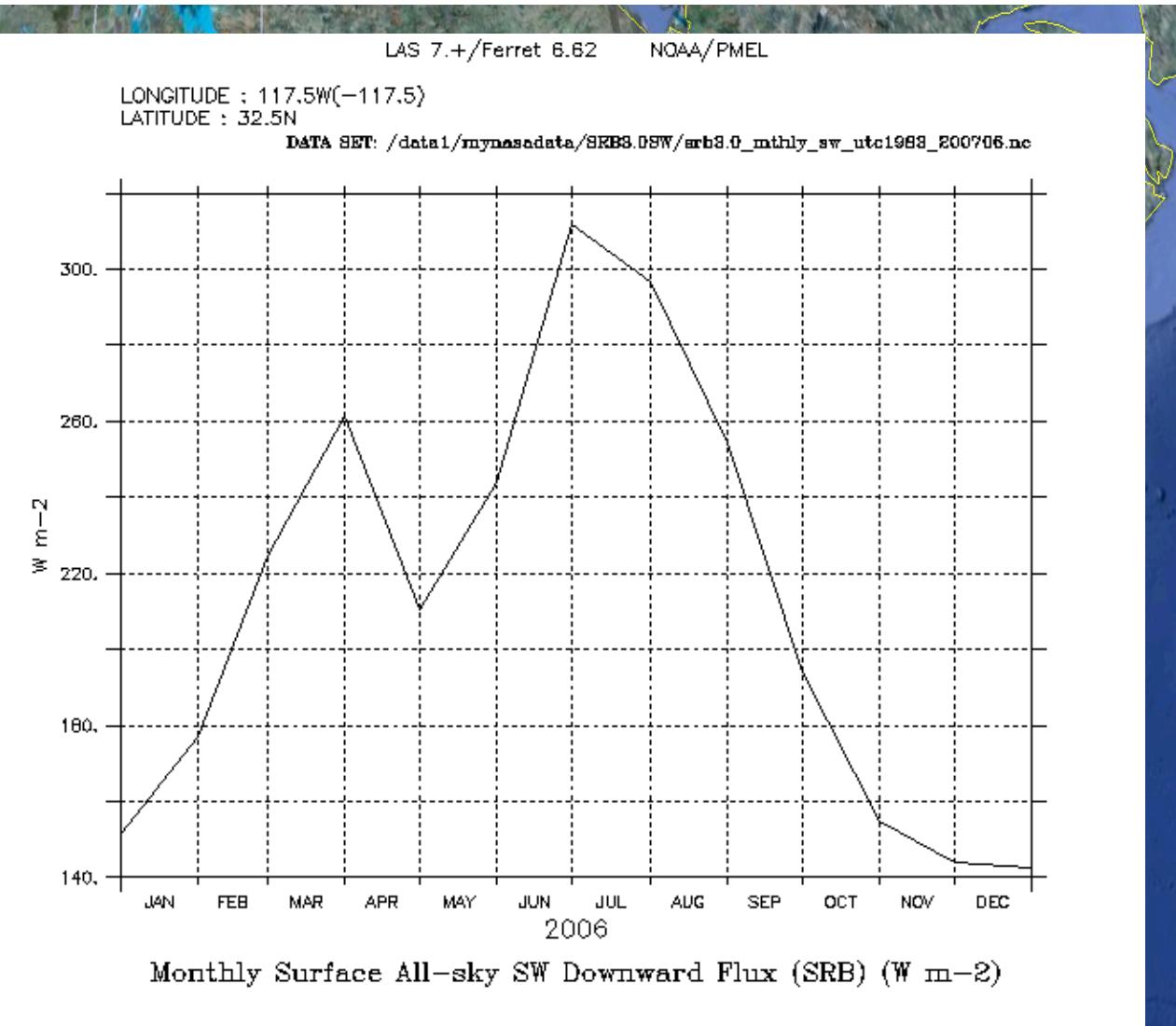
- Can you find trends in the year?
  - After looking at the difference plot, what can you conclude about the two locations?

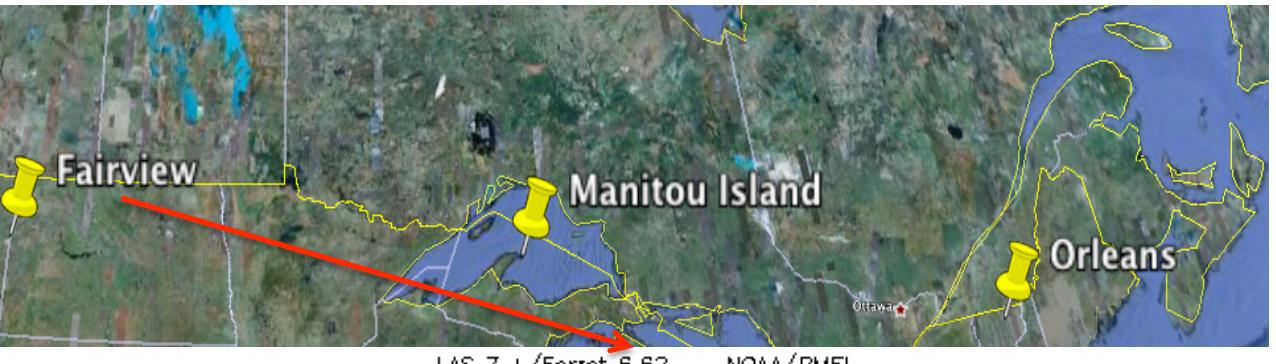








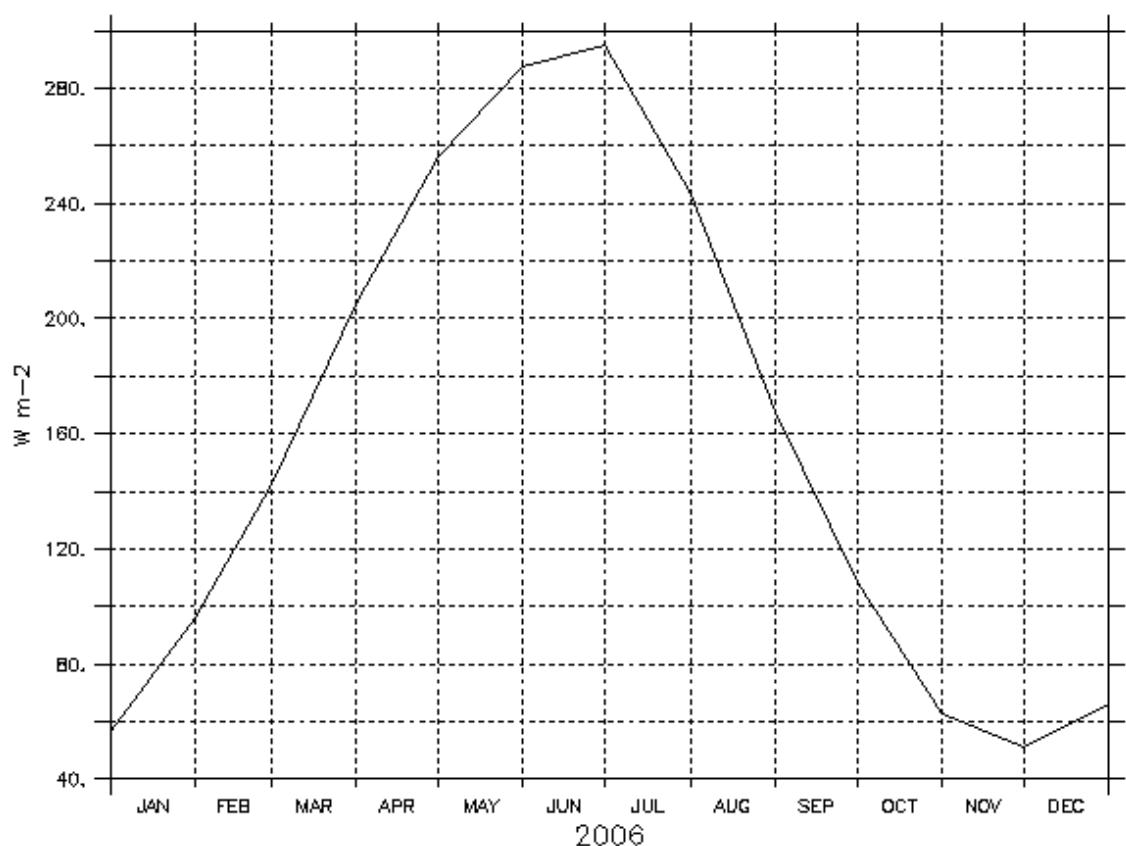




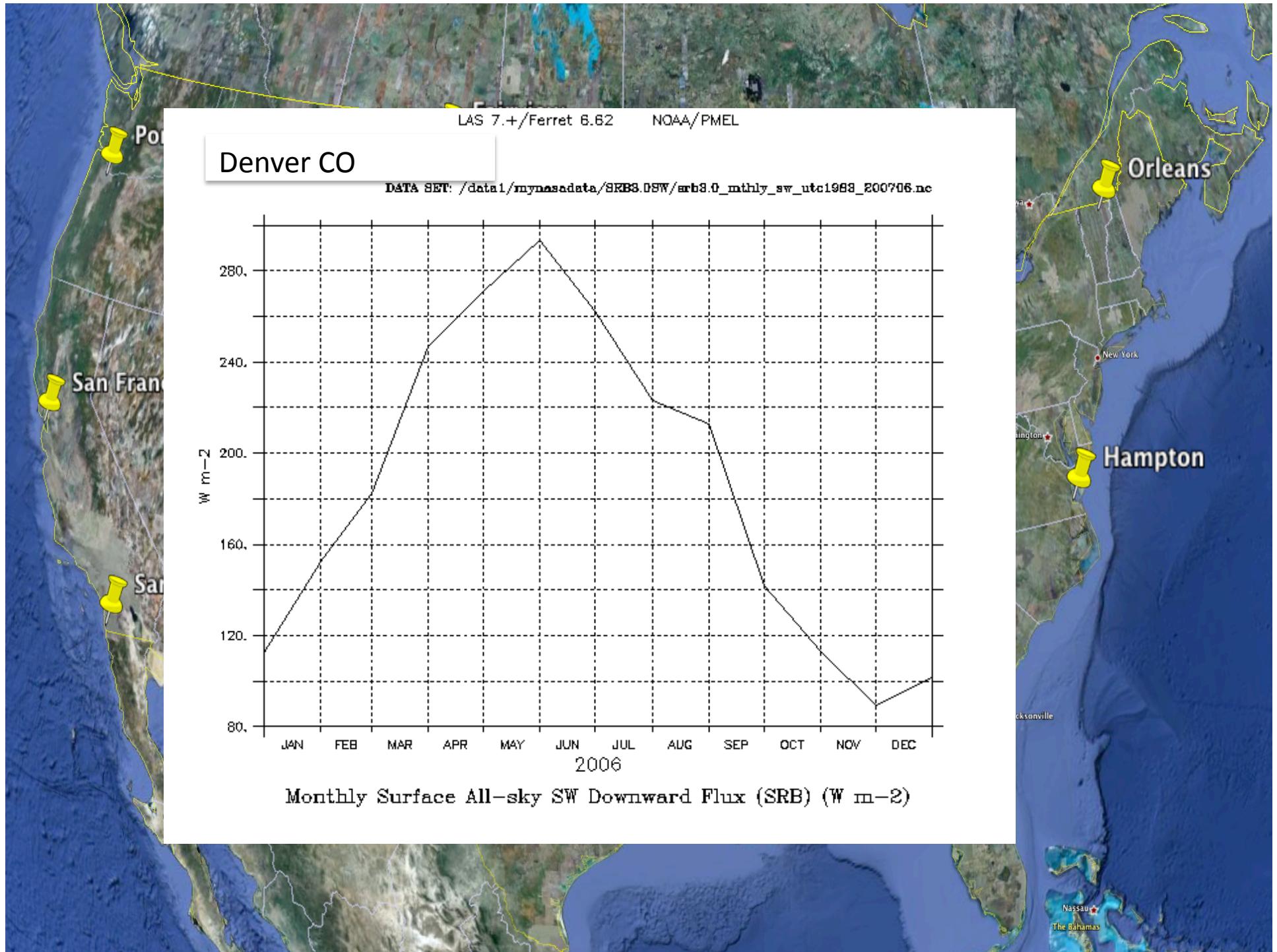
LONGITUDE : 104.5W(-104.5)

LATITUDE : 47.5N

DATA SET: /data1/mynasadata/SRB3.0SW/arb3.0\_mthly\_sw\_utc1983\_200706.nc



Monthly Surface All-sky SW Downward Flux (SRB) ( $\text{W m}^{-2}$ )



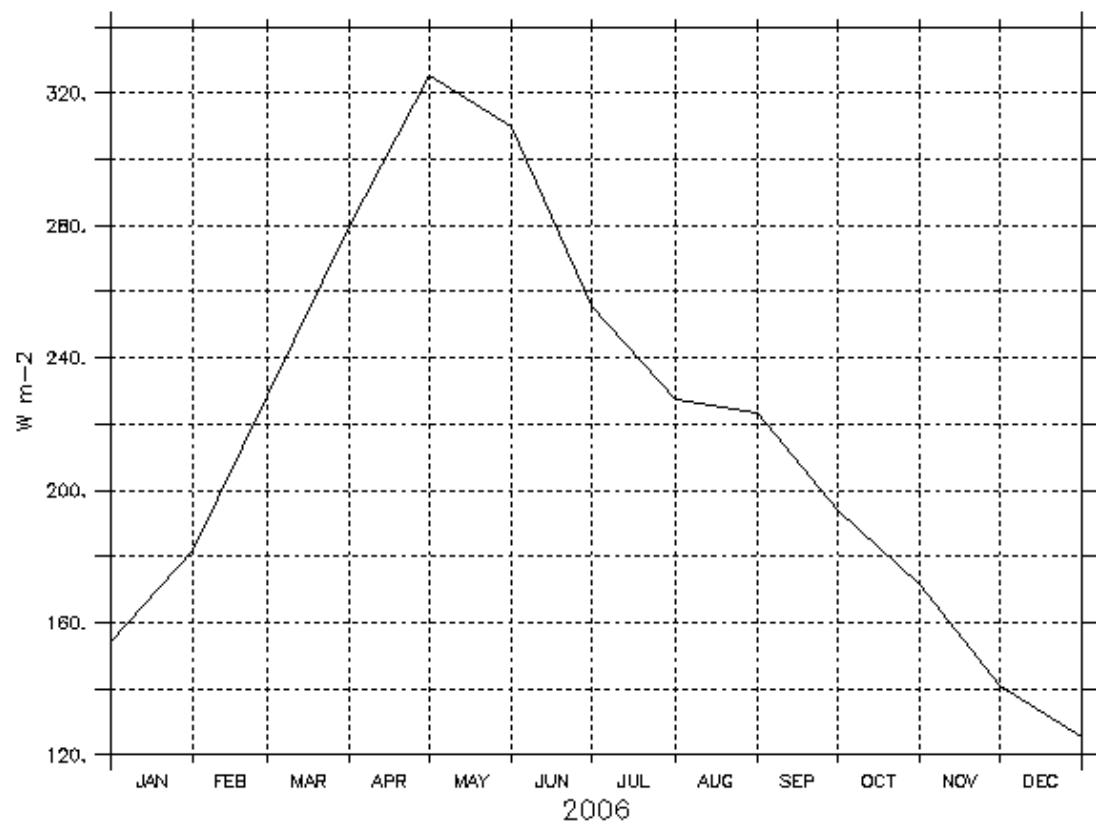


LAS 7.+/Ferret 6.62 NOAA/PMEL

LONGITUDE : 106.5W(-106.5)

LATITUDE : 31.5N

DATA SET: /data1/mynasadata/SRB8.0SW/arb8.0\_mthly\_sw\_utc1988\_200706.nc



Monthly Surface All-sky SW Downward Flux (SRB) (W m<sup>-2</sup>)





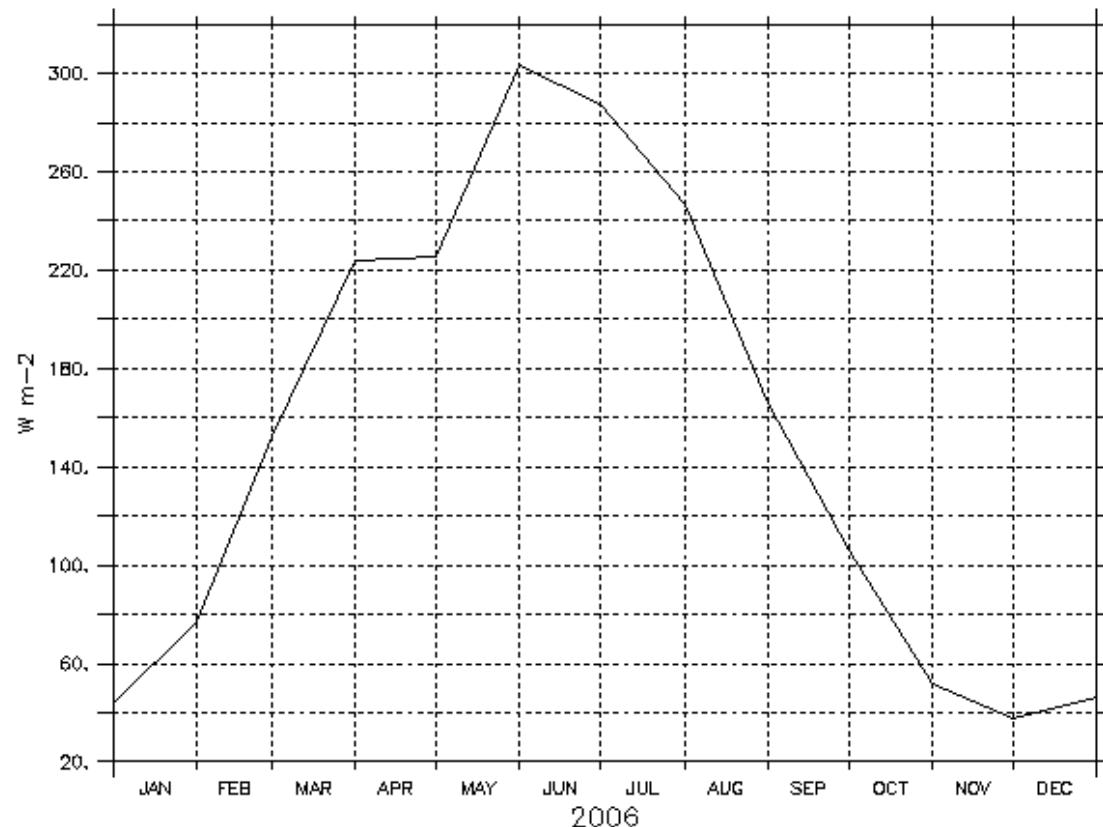
LAS 7.+ / Ferret 6.62

NOAA / PMEL

LONGITUDE : 87.5W(-87.5)

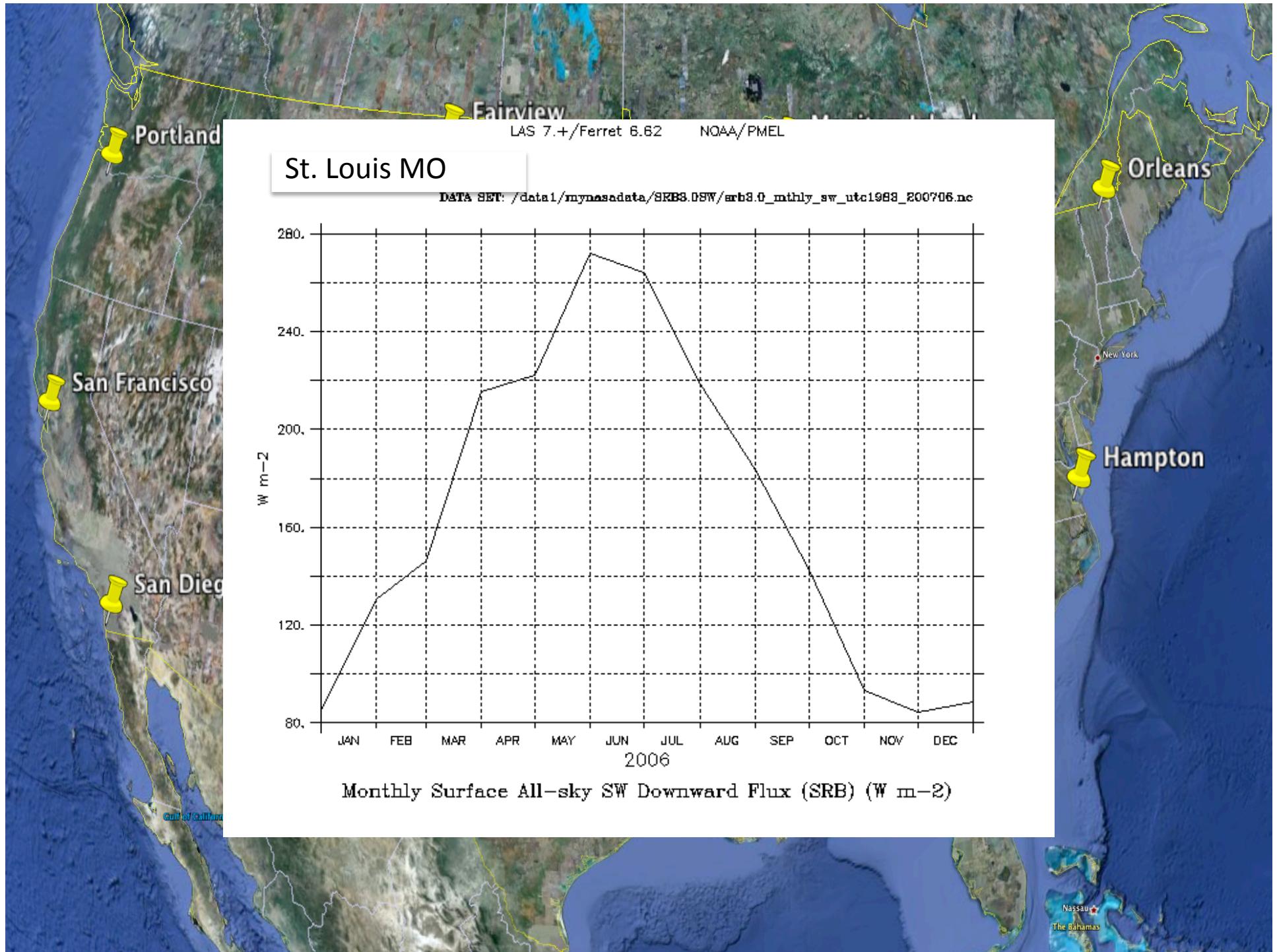
LATITUDE : 47.5N

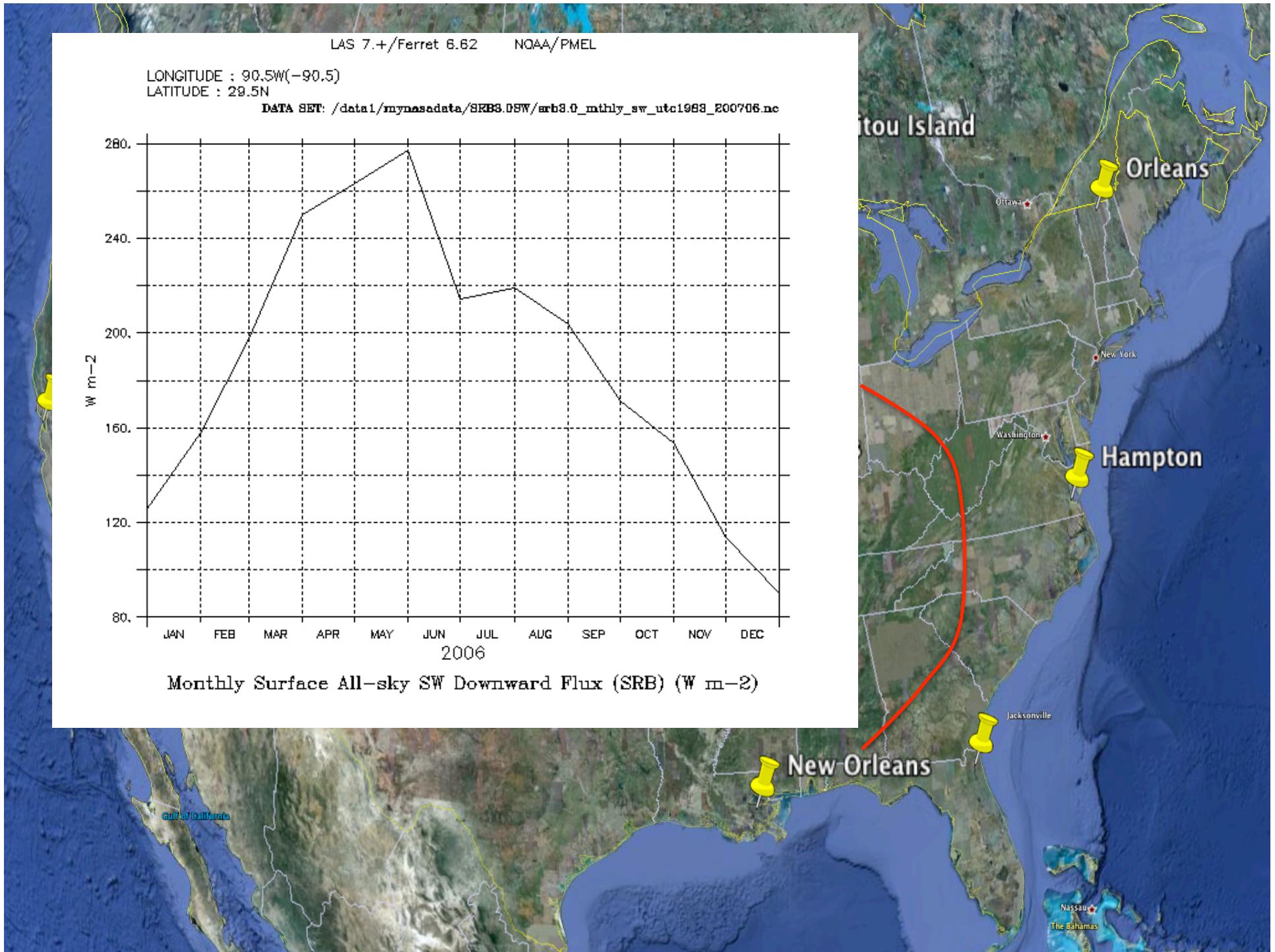
DATA SET: /data1/mynasadata/SRB8.0SW/arb8.0\_mthly\_sw\_utc1968\_200706.nc



Monthly Surface All-sky SW Downward Flux (SRB) ( $\text{W m}^{-2}$ )





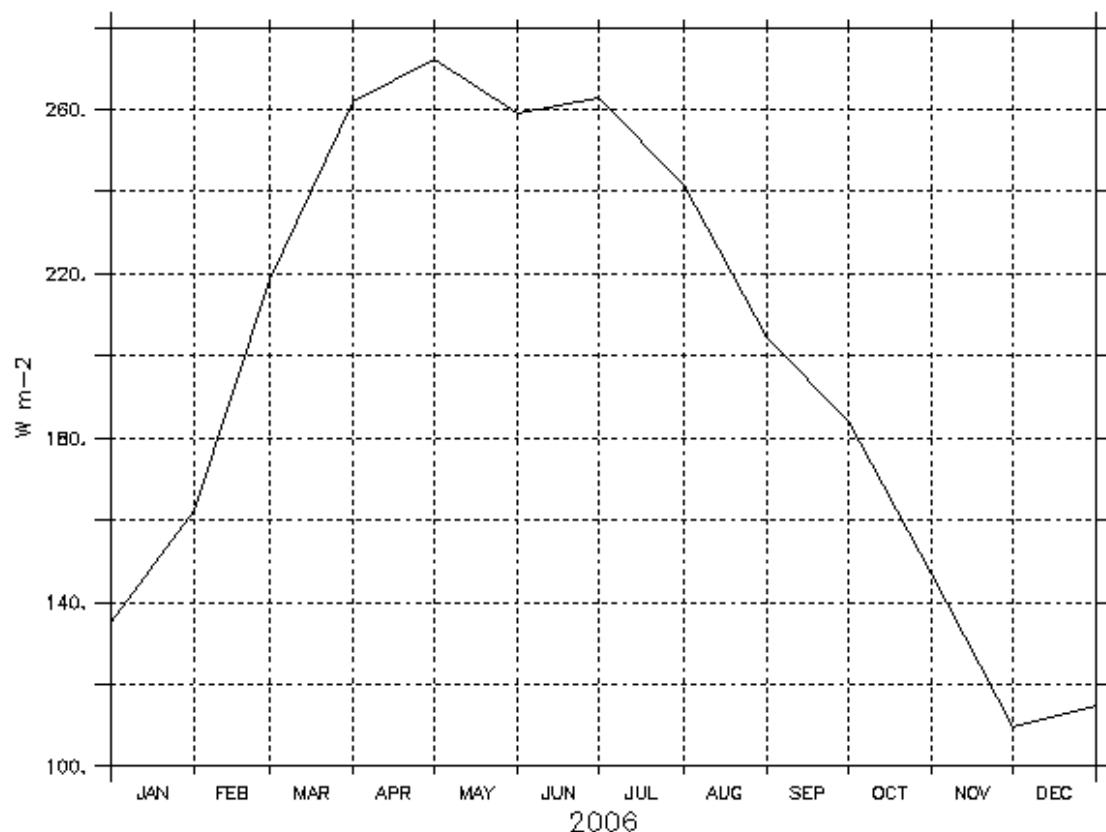


LAS 7.+/Ferret 6.1

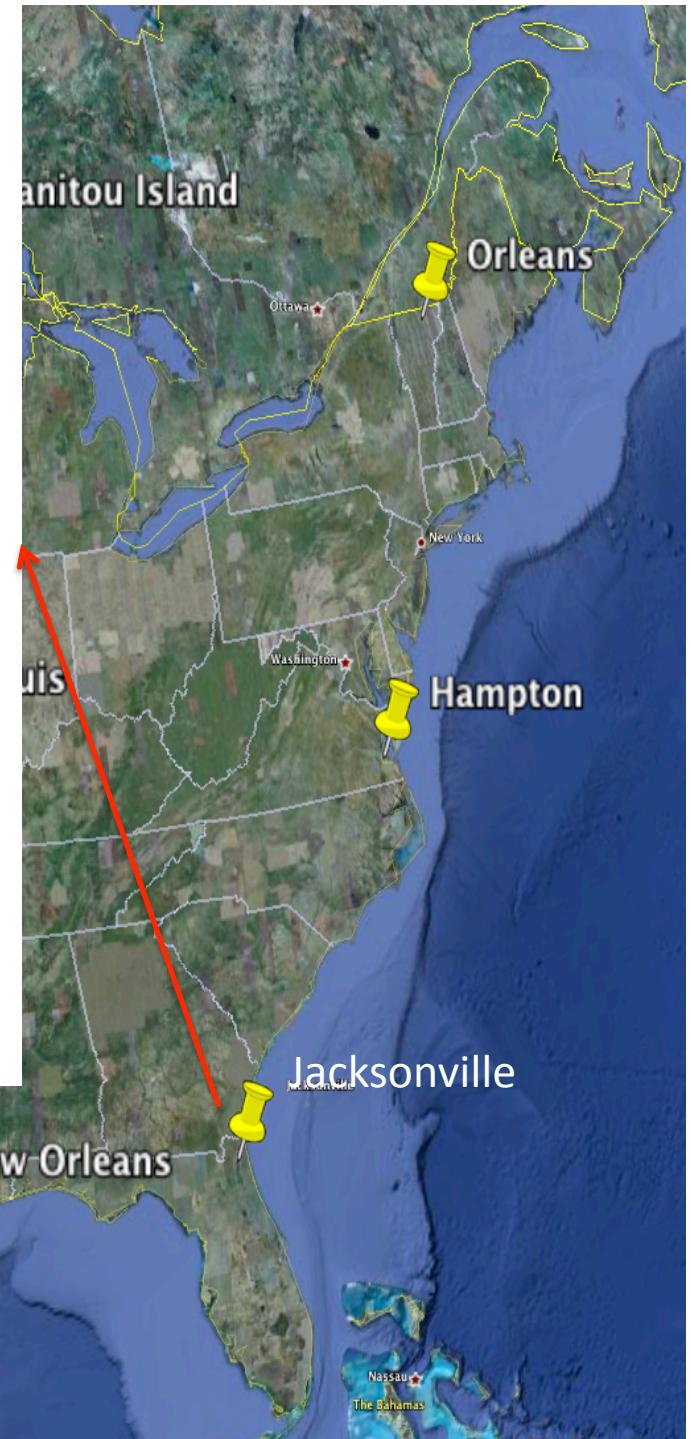
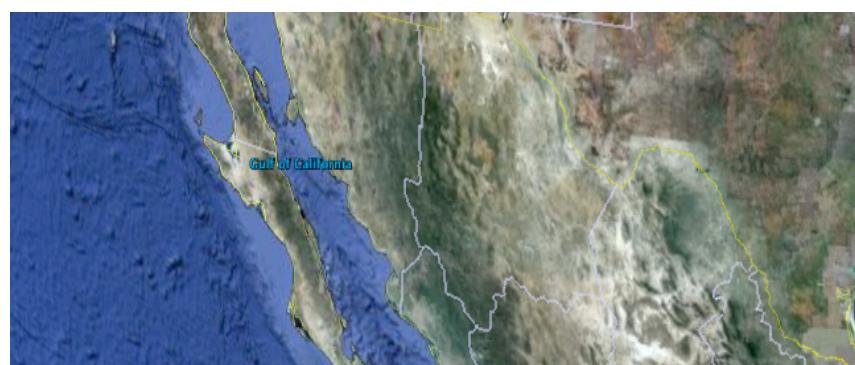
NOAA/PMEI

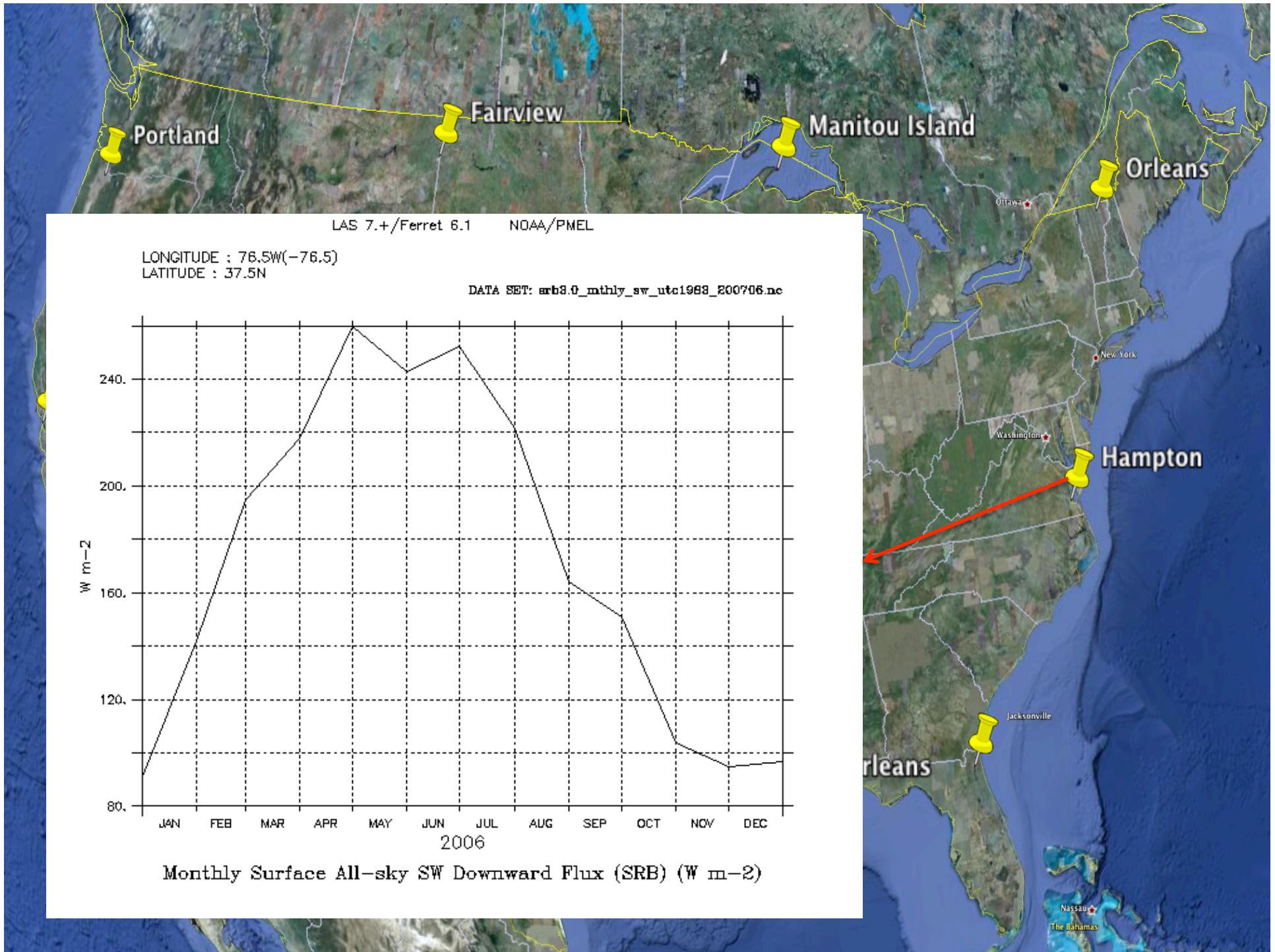
LONGITUDE : 81.5W(-81.5)  
LATITUDE : 30.5N

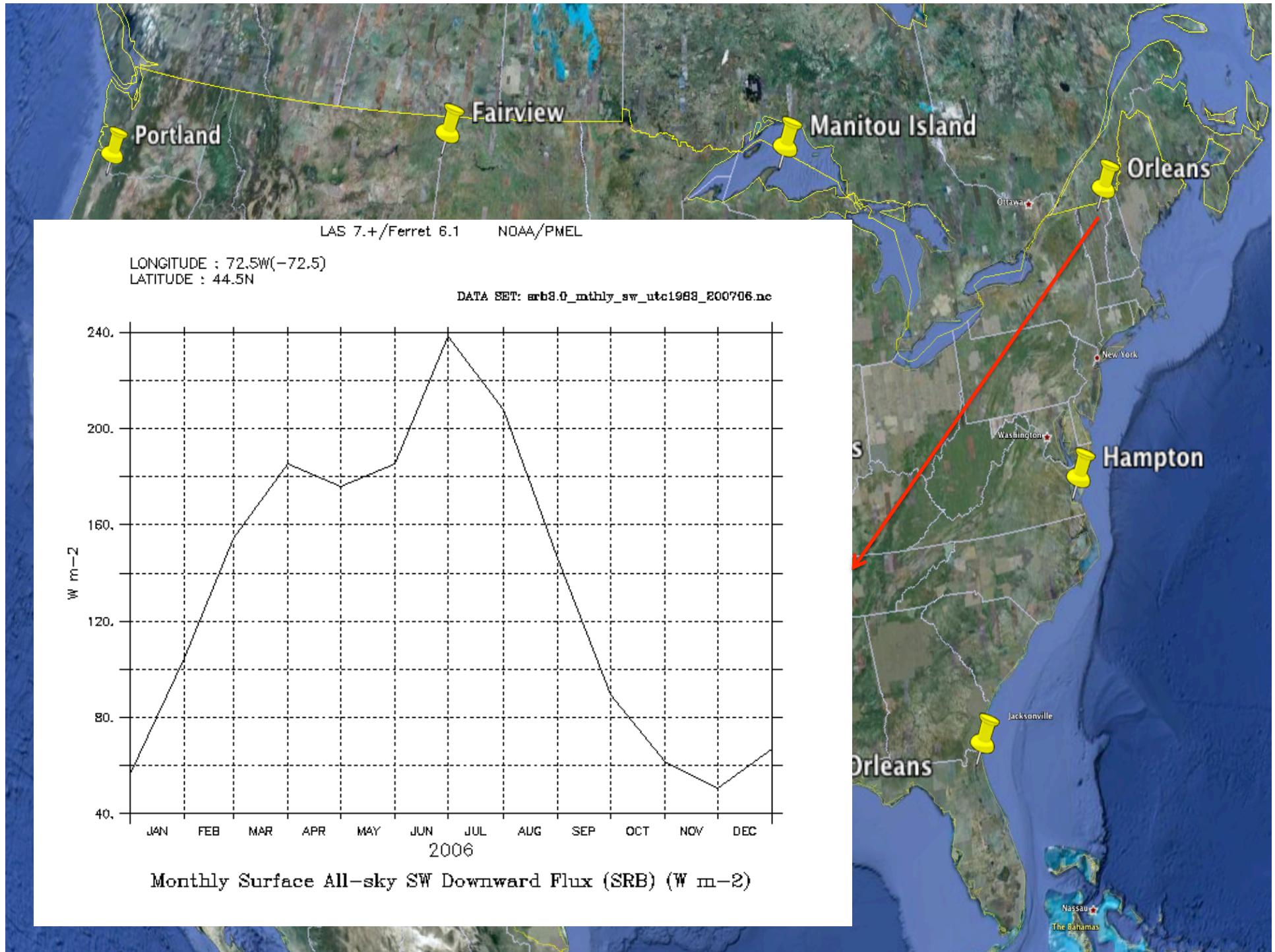
DATA SET: srb8.0\_mthly\_sw\_utc1988\_200706.nc



Monthly Surface All-sky SW Downward Flux (SRB) ( $\text{W m}^{-2}$ )



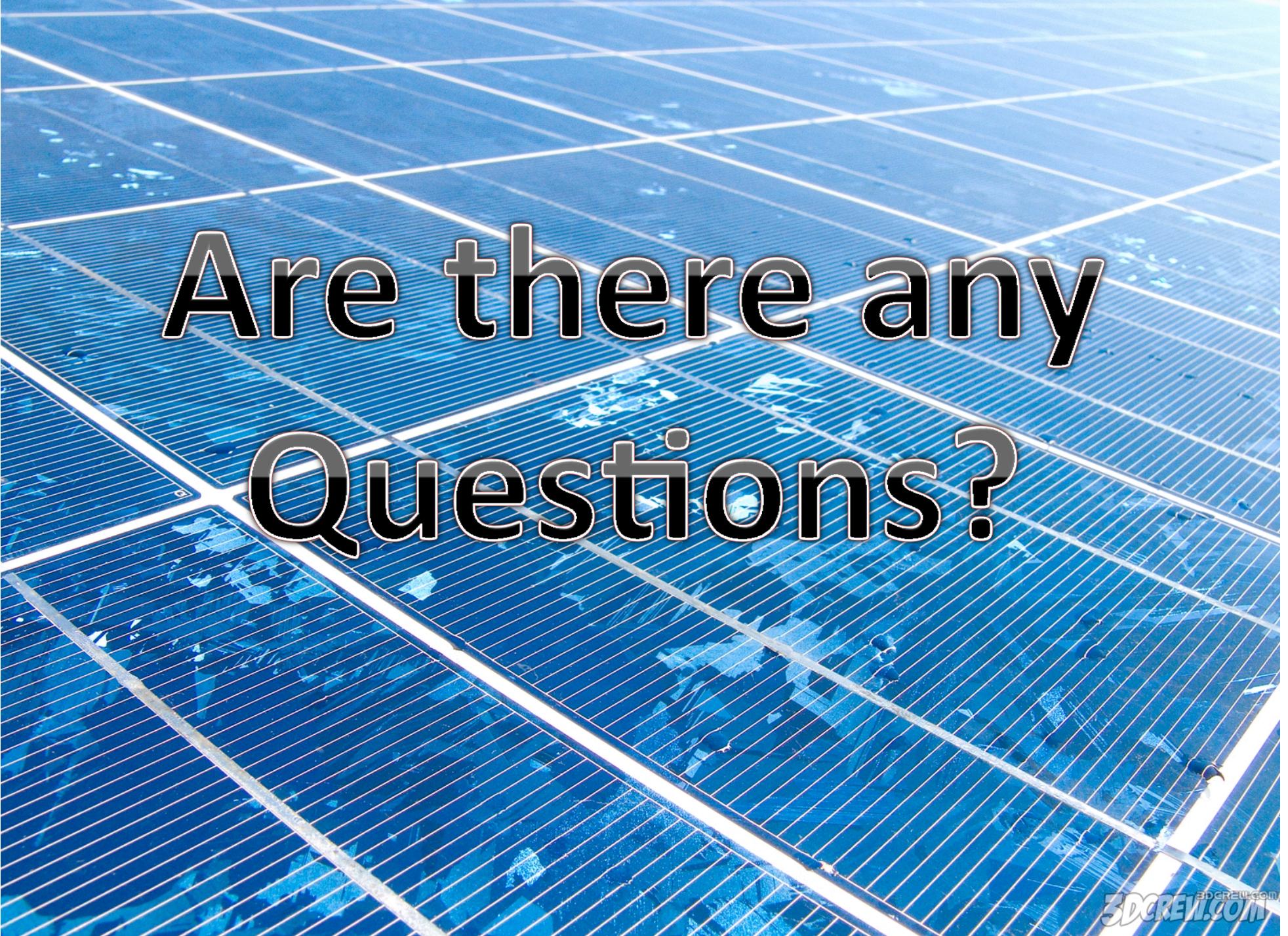




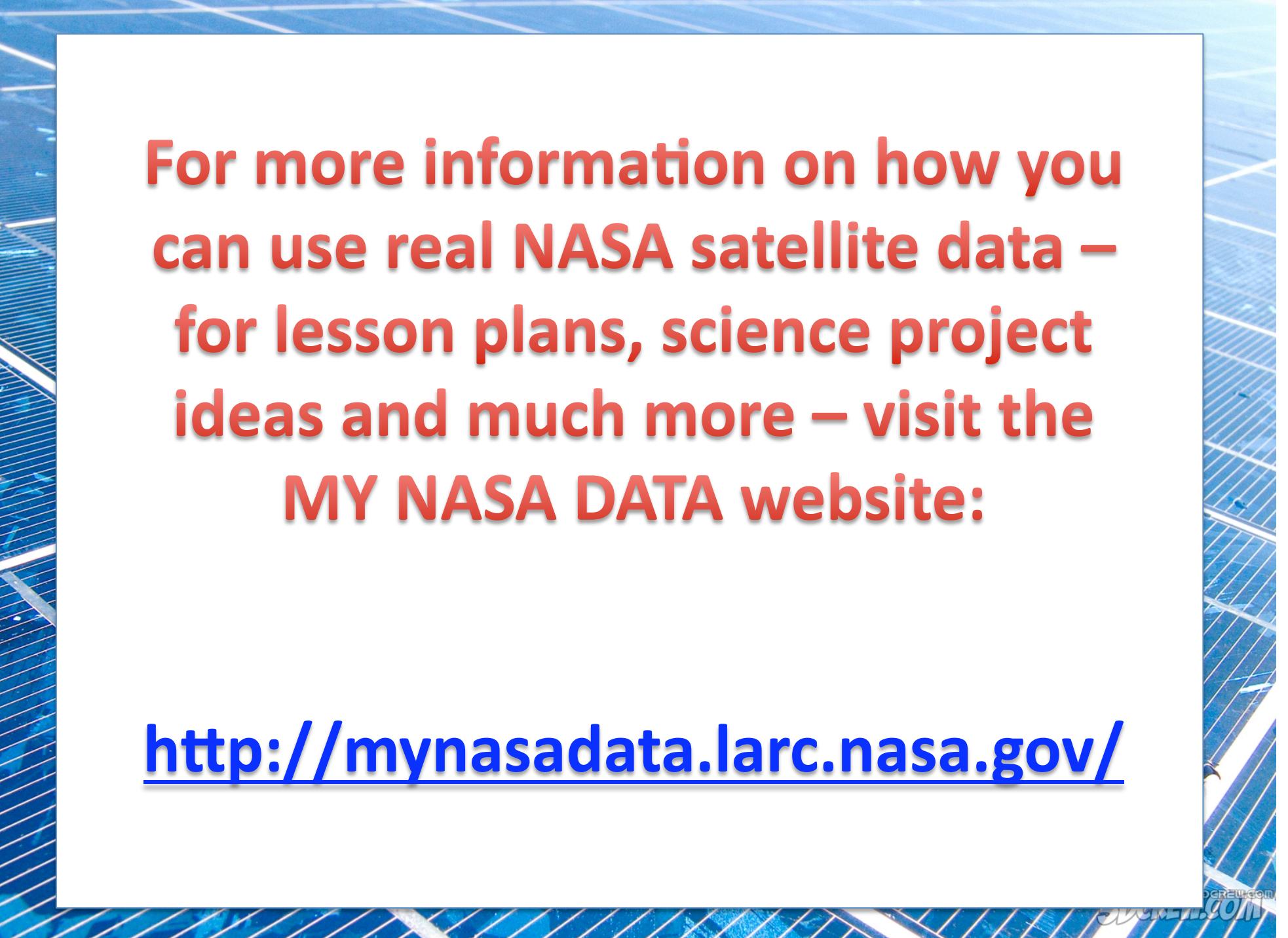
## A Quick Wrap-up

We learned:

1. What solar cells are, and applications for them.
2. That locations differ in the amounts of radiation received, depending on where they live in the US.
3. How to read and use a time series and difference plot.
4. Locations you could live to receive enough radiation to support an RV through out the year.



Are there any  
Questions?



**For more information on how you  
can use real NASA satellite data –  
for lesson plans, science project  
ideas and much more – visit the  
MY NASA DATA website:**

**<http://mynasadata.larc.nasa.gov/>**